

REMARKS

Claims 1-7 are pending in the application. In the Office Action of February 13, 2004, the Examiner made the following disposition:

- A.) Rejected claims 1 and 5 under 35 U.S.C. §102(e) as being anticipated by *Moreton et al.*
- B.) Rejected claims 3 and 4 under 35 U.S.C. §103(a) as being unpatentable over *Moreton et al.* in view of *Ishihara*.
- C.) Rejected claim 7 under 35 U.S.C. §103(a) as being unpatentable over *Moreton et al.* in view of *Sekine et al.* and further in view of *Tabita*.
- D.) Rejected claims 2 and 6 under 35 U.S.C. §103(a) as being unpatentable over *Moreton et al.* and further in view of *Ishihara* and *Tabata et al.*

Applicant respectfully traverses the rejection and addresses the rejections as follows:

- A.) Rejection of claims 1 and 5 under 35 U.S.C. §102(e) as being anticipated by *Moreton et al.*:

Applicant respectfully disagrees with the rejection.

Claims 1 and 2 have each been amended to include the subject matter of claims 3 and 4, namely a light-shielding means and a light limiting means. Claim 5 has been amended to clarify that the video signals represent different images. Claims 3-4 and 7 have been canceled.

Referring to Applicant's Figures 1 and 4 for illustrative purposes, Applicant's independent claim 1 claims a three-dimensional image-capturing apparatus comprising a single solid-state image-sensing device 1 having a plurality of image capturing regions 1a, 1b. Each image capture region simultaneously captures a different image on the single solid-state image-sensing device. A plurality of optical systems are for forming images of a subject in the image-capturing regions. Each one of the optical systems corresponds to a different one of the image-capturing regions 1a, 1b. The optical systems include a plurality of reflection means 5a, 6a, 5b, 6b for reflecting rays from the subject a number of times. At least a lens 3a, 3b is provided to be closer to the single solid-state image-sensing device 1 than the closest reflection means 6a, 6b to the subject among the reflection means 5a, 6a, 5b, 6b. The reflection means 5a, 6a, 5b, 6b and the lenses 3a, 3b of the optical systems are used to form, in the corresponding image-capturing regions 1a, 1b, separate and different images of the subject which are captured from different viewpoints having a distance therebetween.

Therefore, claim 1 claims a three-dimensional image-capturing apparatus that has a single solid-state image-sensing device having a plurality of image-capturing regions, which each

capture a different image. A different optical system is associated with each image-capturing region to beneficially provide a three-dimensional image. This provides a beneficial economic improvement over conventional devices that require two cameras or two image-sensing devices, since claim 1 captures different images of a subject from different viewpoints on one image-sensing device.

Claim 1 further claims a light-shielding means 7 provided at least between the single solid-state image-sensing device and the reflection means so as to separate the optical systems for forming the different images of the object in the respective image-capturing regions. As described in Applicant's specification, the light-shielding means prevents optical cross-talk between the optical systems. (Applicant's specification, page 9, lines 15-23). Further, light-limiting means 18a and 18b are provided to be closer to the subject than the reflection means for the  $(2n-1)$ -th reflection (where n represents a positive integer) from the single solid-state image-sensing device along the optical systems. The light-limiting means 18a and 18b prevent incidence of flux of ambient light outer from rays forming each image of the subject.

This is clearly unlike *Moreton*, which fails to disclose or even suggest Applicant's claimed light-shielding means and light-limiting means. Referring to *Moreton* Figure 1, *Moreton* discloses diaphragm slits 4a and 4b that are separated by a distance to provide stereo differentiation between images. However, *Moreton*'s slits 4a and 4b fail to disclose or suggest Applicant's claimed light-shielding means 7 or light-limiting means 18a and 18b. As claimed by Applicant, Applicant's light-shielding means 7 separates optical systems. This is clearly unlike *Moreton*'s slits 4a and 4b, which do not separate any optical systems. Further, Applicant's claimed light-limiting means 18a and 18b are provided to be closer to a subject than a reflection means. Nowhere does *Moreton* even suggest a light-limiting means provided closer to a subject than any of its reflection means.

Therefore, for at least these reasons, *Moreton* fails to disclose or even suggest claim 1.

Claim 5 depends directly or indirectly from claim 1 and are therefore allowable for at least the same reasons that claim 1 is allowable.

Applicant respectfully submits the rejection has been overcome and requests that it be withdrawn.

B.) Rejection of claims 3 and 4 under 35 U.S.C. §103(a) as being unpatentable over *Moreton et al.* in view of *Ishihara*:

Applicant respectfully disagrees with the rejection.

As described above, claim 1 has been amended to include the subject matter of claims 3 and 4, namely a light-shielding means and light limiting means.

Applicant's claim 1 is allowable over *Moreton* as described above. *Moreton* in view of *Ishihara* still fails to disclose or suggest claim 1. Unlike Applicant's claim 1, *Ishihara* fails to disclose or even suggest Applicant's claimed light-shielding means 7. As described above, Applicant's claimed light-shielding means 7 is provided at least between the single solid-state image-sensing device and the reflection means so as to separate the optical systems for forming the different images of the object in the respective image-capturing regions. As described in Applicant's specification, the light-shielding means prevents optical cross-talk between the optical systems. (Applicant's specification, page 9, lines 15-23).

Nowhere does *Ishihara* teach such a light-shielding means. The Examiner argues that *Ishihara's* microlens array 17 and pinhole array 19 disclose or suggest Applicant's light-shielding means, however, *Ishihara's* microlens array 17 and pinhole array 19 are not provided between *Ishihara's* imaging device 25 and *Ishihara's* reflection means 21. Further, unlike Applicant's claim 1, *Ishihara's* microlens array 17 and pinhole array 19 do not separate optical systems for forming different images. Instead, *Ishihara's* microlens array 17 and pinhole array 19 merely divide a light beam into multiple light beams.

Therefore, *Moreton* in view of *Ishihara* still fails to disclose or suggest claim 1.

Applicant respectfully submits the rejection has been overcome and requests that it be withdrawn.

C.) Rejection of claim 7 under 35 U.S.C. §103(a) as being unpatentable over Moreton et al. in view of Sekine et al. and further in view of Tabita:

Claim 7 has been canceled.

Applicant respectfully submits the rejection has been overcome and requests that it be withdrawn.

D.) Rejection of claims 2 and 6 under 35 U.S.C. §103(a) as being unpatentable over Moreton et al. and further in view of Ishihara and Tabata et al.:

Applicant respectfully disagrees with the rejection.

Similar to claim 1, claim 2 as amended claims a light-shielding means 7 provided at least between the single solid-state image-sensing device and the imaging-side reflection means so as to separate the optical systems for forming the different images of the object in the respective

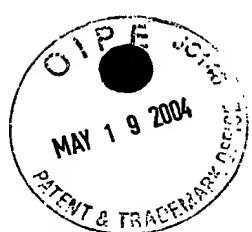
image-capturing regions. As described in Applicant's specification, the light-shielding means prevents optical cross-talk between the optical systems. (Applicant's specification, page 9, lines 15-23). Further, light-limiting means 18a and 18b are provided to be closer to the subject than the subject-side reflection means for the  $(2n-1)$ -th reflection (where n represents a positive integer) from the single solid-state image-sensing device along the optical systems. The light-limiting means 18a and 18b prevent incidence of flux of ambient light outer from rays forming each image of the subject.

As described above with respect to claim 1, *Moreton* in view of *Ishihara* fails to disclose or suggest Applicant's claimed light-shielding means. Therefore, claim 2 is allowable over *Moreton* in view of *Ishihara* for at least the same reasons that claim 1 is allowable.

*Tabata* also fails to teach a light-shielding means. Referring to *Tabata* Figure 25, *Tabata* discloses two optical systems that have no light-shielding means separating them. Therefore, *Moreton* in view of *Ishihara* and *Tabata* still fails to disclose claim 2.

Claim 1 is allowable over *Moreton* in view of *Ishihara* as discussed above. *Tabata* still fails to disclose or suggest Applicant's claimed light-shielding means and light-limiting means. Therefore, *Moreton* in view of *Ishihara* and *Tabata* still fails to disclose or suggest claim 1. Claim 6 depends directly or indirectly from claim 1 and is therefore allowable for at least the same reasons that claim 1 is allowable.

Applicant respectfully submits the rejection has been overcome and requests that it be withdrawn.



CONCLUSION

In view of the foregoing, it is submitted that claims 1, 2, 5 and 6 are patentable. It is therefore submitted that the application is in condition for allowance. Notice to that effect is respectfully requested.

Respectfully submitted,

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I hereby certify that this correspondence is being deposited as First Class Mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on May 13, 2004.

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